

PROPORTIONAL SOLENOID-CONTROLLED FLUID VALVE HAVING
COMPACT PRESSURE-BALANCING ARMATURE-POPPET ASSEMBLY

ABSTRACT

A proportional solenoid-driven valve control assembly contains a moveable, magnetic armature adjacent to a fixed pole piece, providing fluid leakage containment, and having no non-magnetic element for alignment, support or magnetic flux path control. A valve unit coupled with the armature contains a fluid cavity in fluid communication with a fluid inlet port and a fluid exit port. The valve is closed by a poppet coupled with the armature. To compensate for fluid pressures exerted against the poppet, a flow restriction is provided between an armature cavity and the fluid cavity. Also, a bore is formed through the armature to provide fluid communication between the fluid exit port and the armature cavity. This serves to balance fluid pressures at the fluid inlet and exit ports applied to the opposite sides of the fluid flow restriction.